



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of:

Raphael Ihringer et al.

Serial No. 10/500,515

Filed June 30, 2004

SOFC PEN

MAIL STOP 16

October 19, 2005

REQUEST FOR REFUND

MAIL STOP 16
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

A Preliminary Amendment to remove all multiple dependent claims was filed at the time of filing the above-referenced application, but the multiple dependent claim fee of \$145 was charged to Deposit Account 23-3030. Attorney for Applicants hereby respectfully requests that the multiple dependent claim fee of \$145 be credited back to Deposit Account No. 23-3030.

I hereby certify this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to MAIL STOP 16, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313 on October 19, 2005.

Clifford W. Browning
Name of Registered Representative

Clifford W. Browning
Signature

October 19, 2005
Date


Dep & Ref # 807
PATENT MAINTENANCE DIVISION
2005 OCT 27 PM 4:03
US PATENT & TRADEMARK OFFICE

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In addition, Applicants paid \$90 for an additional five (5) claims in excess of the twenty (20) claims of the application. The Preliminary Amendment that was filed with the application canceled claims 1-24 and added new claims 25-49, for a total of 25 claims. Deposit Account 23-3030 was charged a government fee in the amount of \$288 for filing total claims in excess of twenty. Attorney for Applicants hereby respectfully requests that the excess claim fee of \$288 be credited back to Deposit Account No. 23-3030.

A copy of Applicants' Transmittal Letter Form PTO-1390 and a copy of Applicants' Preliminary Amendment, as filed, is enclosed herewith for reference.

Respectfully submitted,

By: 
Clifford W. Browning
Reg. No. 32,201
Woodard, Emhardt et al. LLP
Bank One Center/Tower
111 Monument Circle, Suite 3700
Indianapolis, IN 46204-5137
(317) 634-3456

Attachments

- Transmittal Letter Form PTO-1390
- Preliminary Amendment

#368740

**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

16924-2

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

INTERNATIONAL APPLICATION NO.

PCT/CH03/00008

INTERNATIONAL FILING DATE

9 January 2003

PRIORITY DATE CLAIMED

9 January 2002

TITLE OF INVENTION

SOFC PEN

APPLICANT(S) FOR DO/EO/US

Raphael IHRINGER; Alexandre CLOSSET; Joseph SPER; Olivier Franz BUCHELI

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☐ The US has been elected (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☒ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A preliminary amendment.
14. ☐ An Application Data Sheet under 37 CFR 1.76.
15. ☐ A substitute specification.
16. ☐ A power of attorney and/or change of address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 37 CFR 1.821 - 1.825.
18. ☒ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☒ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☒ Other items or information: International Search Report

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)

INTERNATIONAL APPLICATION NO.
PCT/CH03/00008ATTORNEY'S DOCKET NUMBER
16924-221. ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):**Neither international preliminary examination fee (37 CFR 1.482)
nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO
and International Search Report not prepared by the EPO or JPO..... \$1080.00International preliminary examination fee (37 CFR 1.482) not paid to
USPTO but International Search Report prepared by the EPO or JPO \$920.00International preliminary examination fee (37 CFR 1.482) not paid to USPTO
but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$770.00International preliminary examination fee (37 CFR 1.482) paid to USPTO
but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$730.00International preliminary examination fee (37 CFR 1.482) paid to USPTO
and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00**ENTER APPROPRIATE BASIC FEE AMOUNT =****CALCULATIONS PTO USE ONLY**

\$ 920

Surcharge of \$130.00 for furnishing the oath or declaration later than 30 months
from the earliest claimed priority date (37 CFR 1.492(e)).

\$

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	25 - 20 =	5	x \$18.00
Independent claims	2 - 3 =	0	x \$86.00

\$ 90

\$ 0

MULTIPLE DEPENDENT CLAIM(S) (if applicable)

+ \$290.00

\$ 0

TOTAL OF ABOVE CALCULATIONS =

\$ 1010

☒ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above
are reduced by 1/2.

\$ 505

SUBTOTAL =

\$ 505

Processing fee of \$130.00 for furnishing the English translation later than 30 months
from the earliest claimed priority date (37 CFR 1.492(f)).

\$

TOTAL NATIONAL FEE =

\$ 505

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be
accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +

\$ 160

TOTAL FEES ENCLOSED =

\$ 665

Amount to be
refunded:

\$

charged:

\$

a. ☒ A check in the amount of \$ 665 to cover the above fees is enclosed.b. ☐ Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
overpayment to Deposit Account No. 23-3030. A duplicate copy of this sheet is enclosed.
(but not issue fees)d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. Credit card
information should not be included on this form. Provide credit card information and authorization on PTO-2038.**NOTE:** Where an appropriate time limit under 37 CFR 1.495 has not been met, a petition to revive (37 CFR 1.137 (a)
or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Clifford W. Browning
Woodard Emhardt et al.
Bank One Center/Tower
111 Monument Circle, Suite 3700
Indianapolis, IN 46204-5137
browning@worldip.com

SIGNATURE

Clifford W. Browning

NAME

32,201

REGISTRATION NUMBER



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent)
application of:) MAIL STOP PCT
)
Raphael Ihringer et al.)
)
Corresponding to International)
Application No. PCT/CH03/00008)
)
Filed January 9, 2003)
)
SOFC PEN) June 30, 2004

COPY

PRELIMINARY AMENDMENT

Mail Stop PCT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

As a Preliminary Amendment to the above-referenced Application, please enter the following amendments prior to computing the filing fees therefore.

Express Mail Label No. EY466866176US
Date of Deposit: June 30, 2004

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR §1.10 on the date indicated above and is addressed to MAIL STOP PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Raphael X. Ihringer
Signature of person mailing paper or fee

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IN THE CLAIMS:

Please cancel claims 1-24 without prejudice and add new claims 25-49, as follows:

Claims 1-24 (canceled)

25. (new): An SOFC PEN with a cathode, said cathode comprising a porous cathode layer (cpc) and an active cathode layer (cac), with an anode, said anode comprising an active anode layer (caa), an anode support layer (csa, csa1, csa2), said anode support layer constituting the mechanical support of the PEN, and with at least one electrolyte layer (e), said electrolyte layer being placed between said active anode and cathode layers, wherein said anode comprises an anode collector layer (cca, cca1, cca2) which covers the rear face of the anode support layer, and in that the anode collector layer presents, on its rear face which is designed to come into contact with an interconnecting plate (i), a raised structure which is chosen so as to form gas circulation channels with said interconnecting plate.

26. (new): The SOFC PEN as claimed in claim 25, wherein the cathode also has, on its rear face which is designed to come into contact with an interconnecting plate (i), a raised structure which is chosen so as to form gas circulation channels with said interconnecting plate, and in that the raised structures of the anode and of the cathode each comprise a plurality of prominent bumps (6) which are spaced apart from one another, the summit surfaces of the bumps of the anode being substantially coplanar and parallel to the summit surfaces of the bumps of the cathode, the latter likewise being coplanar with one another.

27. (new): The SOFC PEN as claimed in claim 26, wherein it comprises at least one first hole (1) and at least one second hole (2) passing axially through it, in that the raised structure of the rear face of the anode comprises at least one first lip (3) that surrounds said first hole, and in that the raised structure of the rear face of the cathode comprises at least one

second lip that surrounds said second hole, said first hole not being surrounded by a said second lip and said second hole not being surrounded by a said first lip.

28. (new): The SOFC PEN as claimed in claim 27, wherein the raised structures of the respective rear faces of the cathode and anode each comprise an edging (4) that surrounds each rear face, each capable of forming, in collaboration with an interconnecting plate, a chamber that is sealed except on an open portion (5) of said edging.

29. (new): The SOFC PEN as claimed in claim 27, wherein it comprises at least four axial holes and in that the raised structures of the rear faces of the anode and cathode each have an edging that respectively surrounds said rear faces, and at least one inlet hole (7, 9) and one outlet hole (8, 10) for each of the fuel and oxidizing gases respectively.

30. (new): The SOFC PEN as claimed in claim 25, wherein the front face of the anode on the electrolyte side also has a raised structure.

31. (new): The SOFC PEN as claimed in claim 30, wherein the anode support layer (csa) has a raised structure on its front face, in that the active anode layer (caa), the electrolyte (e) and the cathode (cac, cpc) consist of thin layers which cover said raised structure of said front face, and in that the raised structure of said front face of the anode support layer is chosen so that the rear face of the cathode can form gas circulation channels with an interconnecting plate with which it comes into contact.

32. (new): The SOFC PEN as claimed in claim 31, wherein the structure of the front face of the anode support layer is obtained by a molding process and in that the thin layers are obtained by a deposition process.

33. (new): The SOFC PEN as claimed in claim 31, wherein said raised structure of the front face of the anode comprises a plurality of bumps having a height of between 0.2 and

2 mm, and in that the distance between the flanks of neighboring bumps is between 0.1 and 2 mm.

34. (new): The SOFC PEN as claimed in claim 30, wherein the anode support layer (csa) has an anterior raised structure on its front face, in that the active anode layer (caa), the electrolyte (e) and the active cathode layer (cac) consist of thin layers, and in that the porous cathode layer (cpc) has, on its rear face which is designed to come into contact with an interconnecting plate, a raised structure which is chosen so as to form gas circulation channels with said interconnecting plate.

35. (new): The SOFC PEN as claimed in claim 34, wherein said anterior raised structure of the front face of the anode support layer is obtained by stamping.

36. (new): The SOFC PEN as claimed in claim 34, wherein said anterior raised structure of the front face of the anode support layer is obtained by a micromolding process.

37. (new): The SOFC PEN as claimed in claim 36, wherein said anterior raised structure of the front face of the anode support layer is obtained by micromolding and gelling.

38. (new): The SOFC PEN as claimed in claim 34, wherein the height of the raised elements of said anterior raised structure is between 0.1 and 2 mm and in that the distance between neighboring elements is between 50 μ m and 2 mm.

39. (new): The SOFC PEN as claimed in claim 30, wherein the ratio between the height and the thickness of the elements of the raised structure of the front face of the anode is between 1 and 4.

40. (new): The SOFC PEN as claimed in claim 30, wherein the anode is obtained by joining the smooth rear face of the anode support layer to the smooth front face of the anode collector layer.

41. (new): The SOFC PEN as claimed in claim 30, wherein the raised structures of the front faces and/or rear faces of the anode and cathode are obtained by molding, in particular by micromolding and gelling.

42. (new): The SOFC PEN as claimed in claim 25, wherein the material of the anode support layer and/or anode collector layer comprises fibers selected from ceramic fibers and metal fibers.

43. (new): The SOFC PEN as claimed in claim 42, wherein the proportion of said fibers is from 20 to 40% by volume, and in particular from 25 to 35% with respect to the total volume.

44. (new): The SOFC PEN as claimed in claim 25, wherein the material of the porous cathode layer comprises fibers selected from ceramic fibers, in particular LSM fibers and LSC fibers.

45. (new): The SOFC PEN as claimed in claim 42, wherein the diameter (d) of said fibers is between 1 and 50 μm and the ratio L/d is between 2 and 30, in particular in that said diameter is between 2 and 30 μm and the ratio L/d is between 5 and 25, more particularly in that the diameter is between 5 and 15 μm and the ratio L/d is between 8 and 20.

46. (new): The SOFC PEN as claimed in claim 44, wherein the diameter (d) of said fibers is between 1 and 50 μm and the ratio L/d is between 2 and 30, in particular in that said diameter is between 2 and 30 μm and the ratio L/d is between 5 and 25, more particularly in that the diameter is between 5 and 15 μm and the ratio L/d is between 8 and 20.

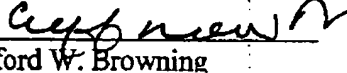
47. (new): The SOFC PEN as claimed in claim 25, wherein the material of the anode support layer and/or anode collector layer comprises a reforming catalyst selected from

Ni deposited on ceramic particles, NiCu deposited on ceramic particles, chromites, CeO₂, and mixtures thereof.

48. (new): The SOFC PEN as claimed claim 47, wherein the amount of catalyst is between 5 and 15% by volume of the material of the anode.

49. (new): An SOFC stack, comprising a plurality of PENs as claimed in claim 27 and interconnecting plates, in an alternating manner, wherein each of said interconnecting plates is a smooth and planar plate provided with holes that are coincident with the holes of the PENs, as seen in the stacking axis.

Respectfully submitted,

By 
Clifford W. Browning
Reg. No. 32,201
Woodard, Emhardt et al. LLP
Bank One Center/Tower
111 Monument Circle, Suite 3700
Indianapolis, IN 46204-5137
(317) 634-3456
browning@worldip.com

#288346

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